DOCUMENT RESUME

ED 163 291 CE 019 023

AUTHOR	Haverland, Edgar M.
TITLE	Technical Training for Managers.
INSTITUTION	Human Resources Research Organization, Fort Bliss, Tex. Div. 5.
SPONS AGENCY	Department of the Army, Washington, D.C.
PUB DATE	[May 66]
NOTE	7p.
EDRS PRICE	MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS	Decision Making Skills; Job Skills; Leadership Responsibility; *Management Education; Management Systems; Mechanical Skills; *Military Training; Officer Personnel; *Operations Research; Programed Instruction; *Supervisory Activities; Supervisory Training; Technical Education
IDENTIFIERS	Army; United States

ABSTRACT

The question has arisen as to what kind of information a manager without extensive technical training needs to learn to supervise effectively. For example, the Nike Hercules fire control platoon leader, usually an officer in his first active duty assignment, seldom has had extensive technical training. Yet he is responsible for the operation/maintenance of complex equipment and the supervision of thirty to fifty men with varied experience. He must also qualify as a battery control officer. In developing the manager's training program, a basic premise formulated was that the officer must be able to determine whether the system is operating satisfactorily. The operation was analyzed to determine the major functions necessary for the unit to successfully fire a missile. Checks and procedures to determine whether the functions were being satisfactorily accomplished and the significance of those findings were selected as part of an educational program. About twelve student-hours of programed instruction were written covering selected checks and procedures, and tests were constructed to measure the amount of technical information learned. In summary, this training approach emphasizes the definition of the officer's role as a technical supervisor and the rationale for selecting a basic, minimum set of technical information. (CSS)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

E·2927
CE
ED163291
CE 019 023

Technical Training for Managers[1]

Edgar M. Haverland

Human Resources Research Office, The George Washington University

A manager does not always "come up through the shop." Actually, in these days of frequent transfers and varied assignments, a manager often has to supervise an operation, the technical details of which he cannot reasonably learn during the relatively brief time he will have charge of it. Under these conditions the question will arise as to what kind of technical information the manager needs to learn quickly, so that he can get on top of the situation and supervise effectively.

In this paper, I will describe how this question was answered for a technical supervisory position in which the problem was quite acute. The Nike Hercules fire control platoon leader is usually a young officer in his first troop assignment after entering active duty, and seldom will he have had extensive technical training. Yet he is responsible for the operation and maintenance of a highly complex set of radars, computers and other electronic equipment. He must supervise the work of 30 to 50 men, many of whom will have had years of experience as maintenance technicians on complex electronic equipment. The rest of them will likely be raw recruits who must be trained

[1] The research reported in this paper was performed by HumRRO Division No. 5 (Air Defense), Fort Bliss, Texas, under Department of the Army contract with The George Washington University. The contents of this paper do not necessarily represent the official opinion of the Department of the Army.

as operators of the equipment. He must qualify as a battery control officer; a kind of chief operator who commands the crew in drills and in action, should an attack occur. He must see to it that the equipment is kept in operational condition and the crew suitably trained so that the unit can carry out its mission if called upon. And half or more of his time will be spent in platoon administrative duties which have little direct connection with this complex equipment system.

In the year or two that he will serve in this position, the platoon leader cannot hope to become technically proficient in depth on the equipment. Thus the question arises: what kind of information does he need to acquire quickly, as a bare minimum, so that he can establish himself as a leader and command the respect and confidence of his men?

This question was answered, first, by considering what the platoon leader's role as a technical supervisor should be, and then by determining what kinds of activities constituted a primary, irreducible minimum performance in discharging his responsibilities. Out of this consideration came the following basic premise: that the primary capability required of an officer in his role as a technical supervisor is that he be able to determine whether the system is operating satisfactorily. If he cannot do this, he will not know when to take corrective action, and generally he will not be able to effectively manage his unit.

To develop methods by which the platoon leader could determine whether the system was operating satisfactorily, the operation of the Nike Hercules system was first analyzed to determine what major functions must be accomplished in order for the unit to fire a missile successfully. Next the checks and procedures needed to determine whether these major system functions

were being satisfactorily accomplished were selected. Finally, the technical information necessary to understand the purposes, significance, and results of these checks and procedures was chosen and incorporated in training material.

The analysis of the Nike Hercules firing procedure produced the following list of major system functions:

(1) Detecting and acquiring the target at a suitable range.

(2) Tracking the target and transmitting target position information to the computer.

(3) Launching and controlling the flight of the missile.

(4) Tracking the missile and transmitting missile position information to the computer.

(5) Solving the intercept problem and generating suitable commands for missile guidance.

Using this list of major system functions as a guide, the checks and procedures necessary to determine whether the system could operate satisfactorily were chosen. Since the platoon leader, when he serves as battery control officer, participates directly in the operation of the equipment, and since a detailed crew drill procedure was specified, there was little difficulty in choosing the information the platoon leader needed to discharge his responsibilities for the operation of the system. We simply taught the crew drill, from the battery control officer's point of view.

The platoon leader's responsibilities in the area of maintenance management were much harder to define. There were over 100 established, periodic checks for the Nike Hercules fire control system, many of them quite complex. In addition, there were literally thousands of more detailed

checks which maintenance technicians might use in troubleshooting malfunctioning equipment. The platoon leader could never hope to learn any great number of this multitude of checks. The key to this problem was found when it was realized that many checks were quite detailed and specific, covering only one, or a few, of the thousands of elementary functions of the equipment. Other checks were quite comprehensive, and dealt with what might be called end-product functions of the equipment system, at or near the level of the major system functions discussed earlier. Hundreds or thousands of elementary equipment functions might be covered by one of these comprehensive checks. Thus we chose a limited number of the most comprehensive checks, to cover the major system functions. This seemed appropriate, since we had decided that the primary requirement was that the officer be able to determine whether the system was operating satisfactorily. If one of these comprehensive checks told him that something was wrong, many of the more detailed checks might be needed to locate the precise malfunction, but we didn't think that it was the officer's job to troubleshoot the equipment. For this he has technicians.

There remained the question of the officer's role with respect to these comprehensive checks. It was not appropriate for the officer to perform the checks, since in many cases the details were quite technical and numerous, and the officer could hardly be expected to learn or remember all of them. Instead, the training emphasized the major steps in setting up and carrying out the checks, and the major system functions covered by the checks. Particularly emphasized were the indications obtained from the checks and their relationship to the major system functions.

An effort was made to avoid placing undue emphasis on either step-by-step, operator-like procedures, or excessive detail concerning electronic

circuits or theory. Generally, an attempt was made to place the emphasis on the parts of the equipment the officer might reasonably encounter, on the functions of the equipment about which he might reasonably be concerned, and on the indications which might reasonably be available to him. In summary, the objective was to teach the officer to be an intelligent and critical observer of the check procedures; that is, a person who understood the significance for system operation of the indications obtained.

About 12 student-hours of linear programed instruction was written, covering the selected checks and procedures, and tests were constructed to measure the amount of technical information learned. The programed instruction was evaluated against directed study of relevant portions of standard Army manuals and texts on the system. In this evaluation the programed instruction proved superior in teaching the technical information.

This paper has emphasized the definition of the officer's role as a technical supervisor and the rationale for selecting a basic, minimum set of the technical information, since it was felt that these were the parts of this study which were of most general interest.

In summary, then, these points could be restated for managers generally in the following fashion. When a manager must supervise an operation in the details of which he cannot reasonably expect to become technically proficient, the first and most important thing he must be able to do is to determine whether the system is operating satisfactorily. To do this, the manager needs first to know the major functions which the system must accomplish in order to operate satisfactorily. Then he must possess the technical information necessary to be an intelligent, critical observer of the checks and procedures which will tell him whether the major system functions are

being accomplished. As a bare minimum, the manager must be able to evaluate the significance for system operation of the indications yielded by these checks and procedures. In selecting a limited set of checks and procedures for this purpose, the notion of a comprehensive check, dealing with end-product system functions and covering many elementary system functions, is quite useful.